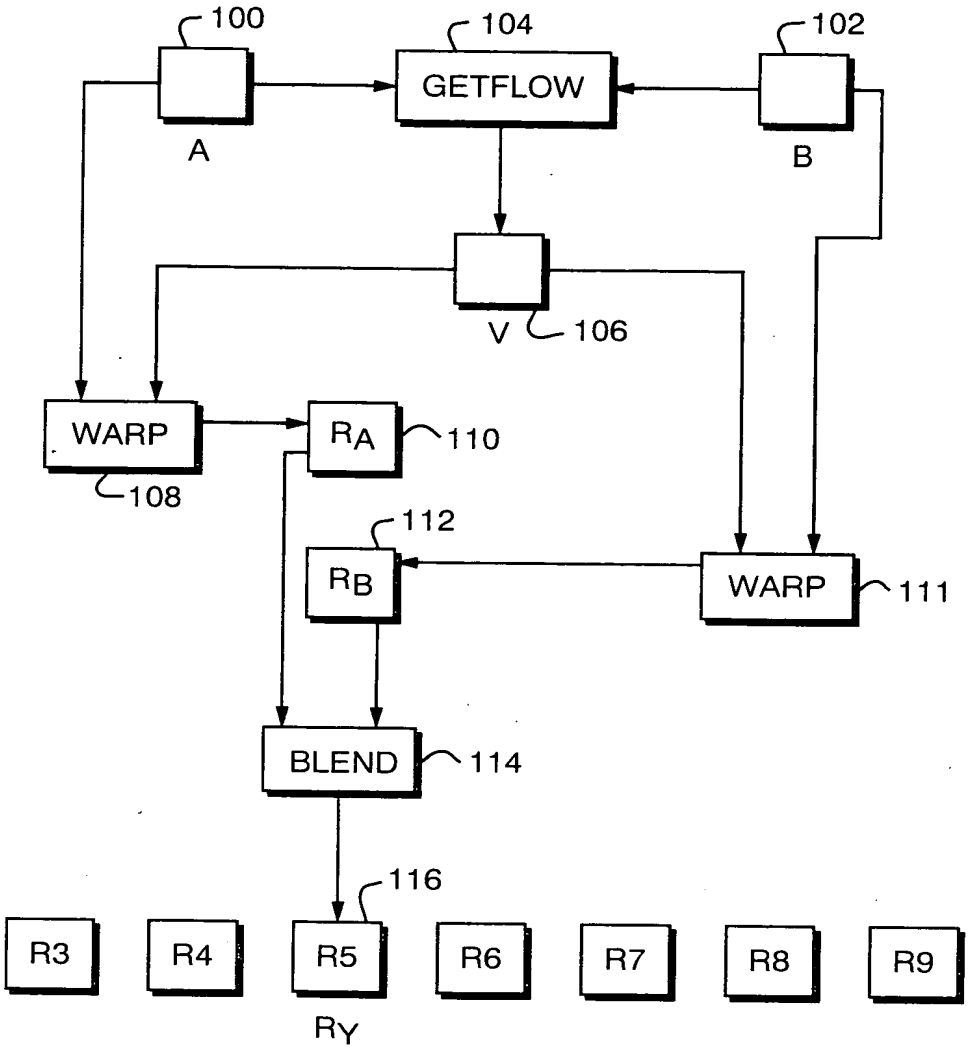

100
104
102
GETFLOW
A
B
V
106
WARP
108
RA
110
112
RB
WARP
111
BLEND
114
116
R3
R4
R5
R6
R7
R8
R9
RY

FIG. 1

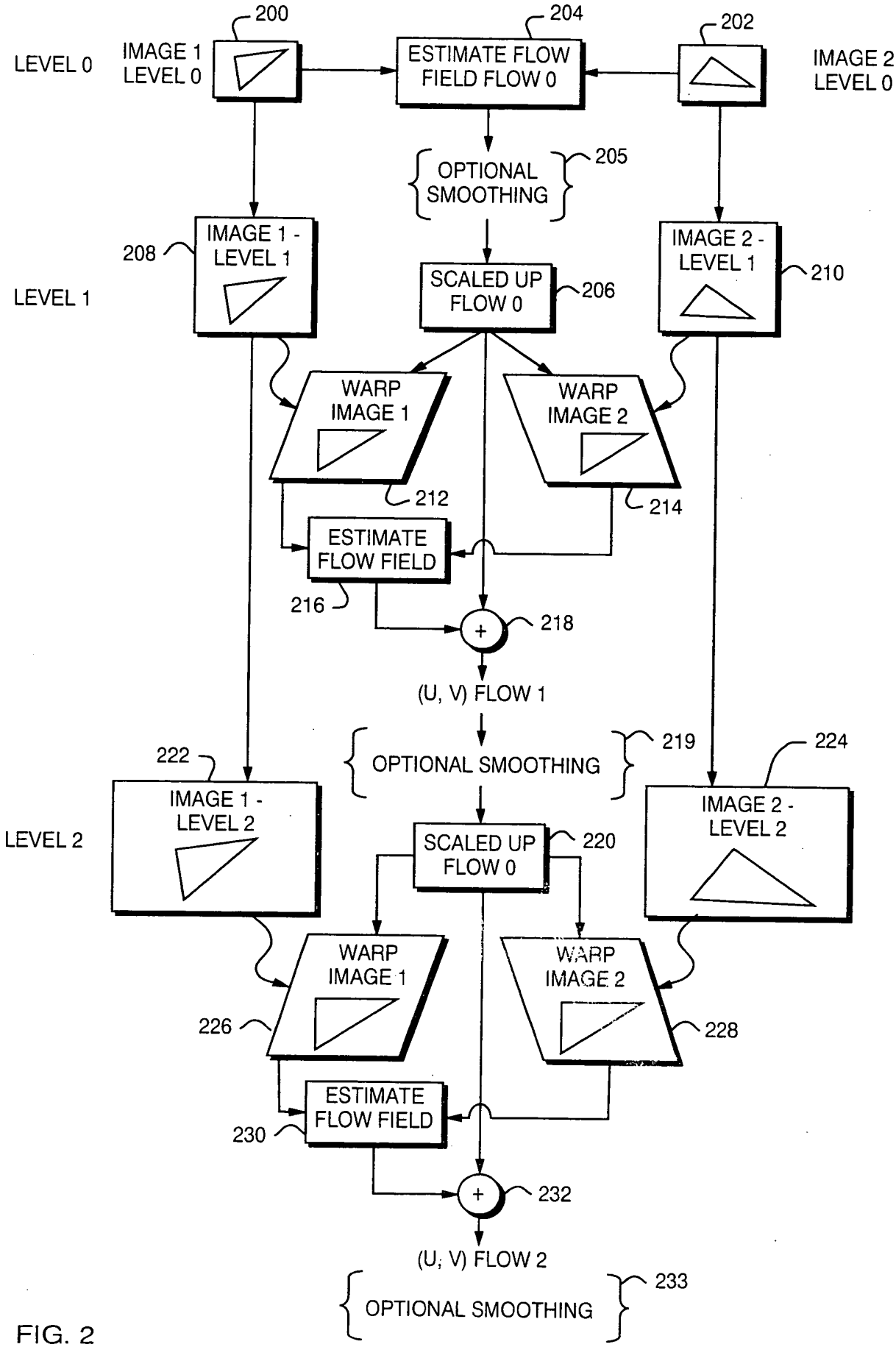
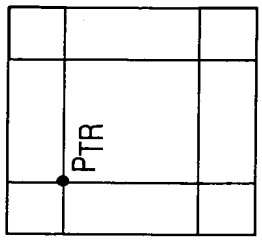
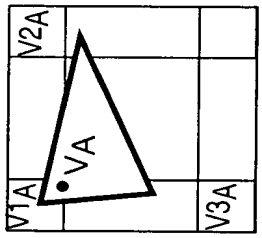

LEVEL 0
IMAGE 1
LEVEL 0
200
ESTIMATE FLOW
FIELD FLOW 0
204
202
IMAGE 2
LEVEL 0
OPTIONAL
SMOOTHING
205
LEVEL 1
208
IMAGE 1 -
LEVEL 1
SCALED UP
FLOW 0
206
IMAGE 2 -
LEVEL 1
210
WARP
IMAGE 1
WARP
IMAGE 2
212
214
ESTIMATE
FLOW FIELD
216
218
(U, V) FLOW 1
OPTIONAL SMOOTHING
219
222
224
LEVEL 2
IMAGE 1 -
LEVEL 2
SCALED UP
FLOW 0
220
IMAGE 2 -
LEVEL 2
WARP
IMAGE 1
WARP
IMAGE 2
226
228
ESTIMATE
FLOW FIELD
230
232
(U, V) FLOW 2
OPTIONAL SMOOTHING
233

FIG. 2



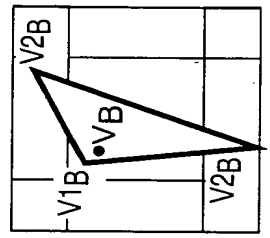
R_{TR}, T_R =1.25

FIG. 3E



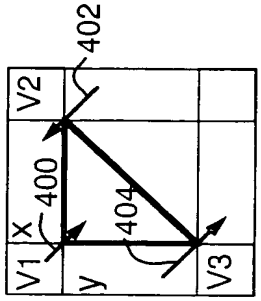
A, T_A =1.0

FIG. 3C



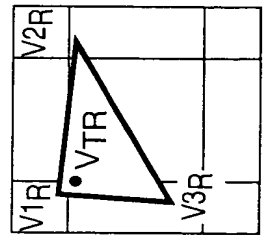
B, T_B =2.0

FIG. 3D



V, T_{AB}=1.5

FIG. 3A



R_{TR},T_R=1.25

FIG. 3B

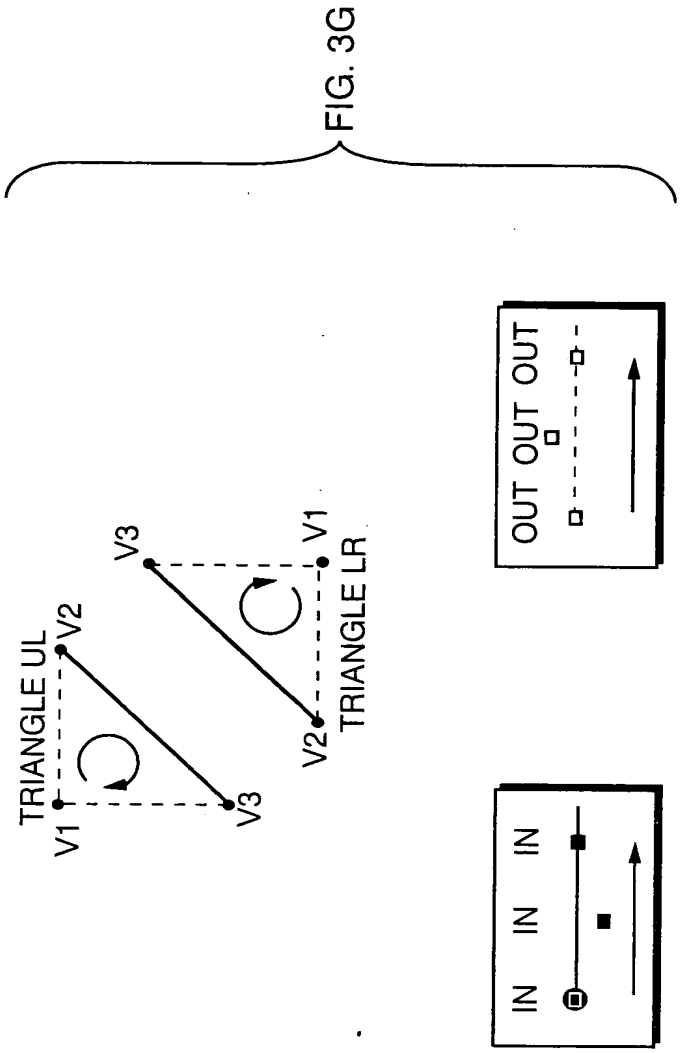


FIG. 3G
TRIANGLE UL
V1
V2
V3
TRIANGLE LR
V3
V1
V2
OUT OUT OUT
IN IN IN

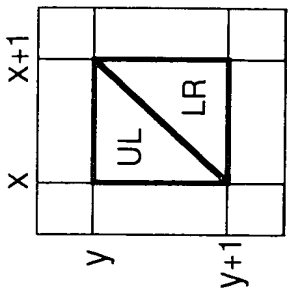

x
x+1
y
y+1
UL
LR

FIG. 3F

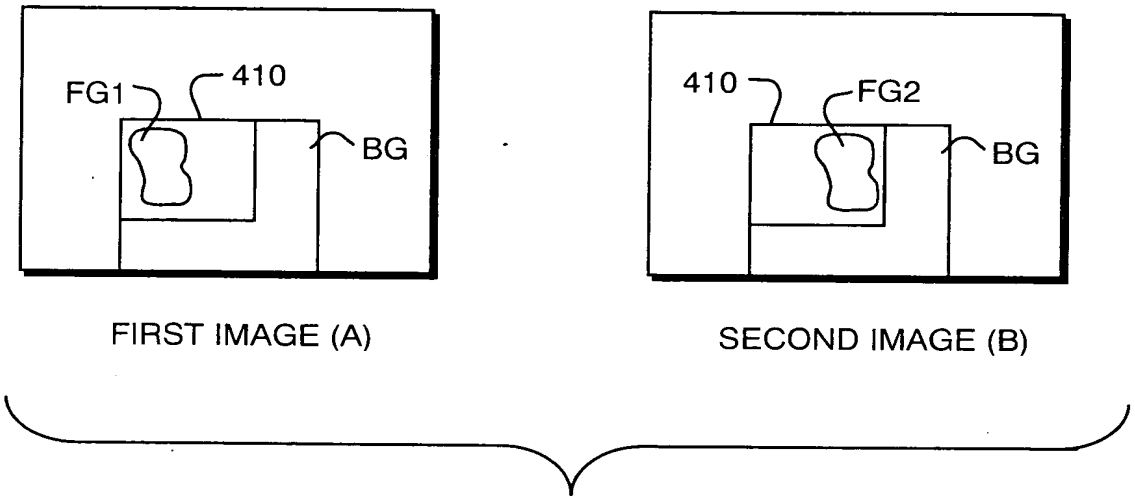

FG1
410
BG
410
FG2
BG
FIRST IMAGE (A)
SECOND IMAGE (B)

FIG. 4A

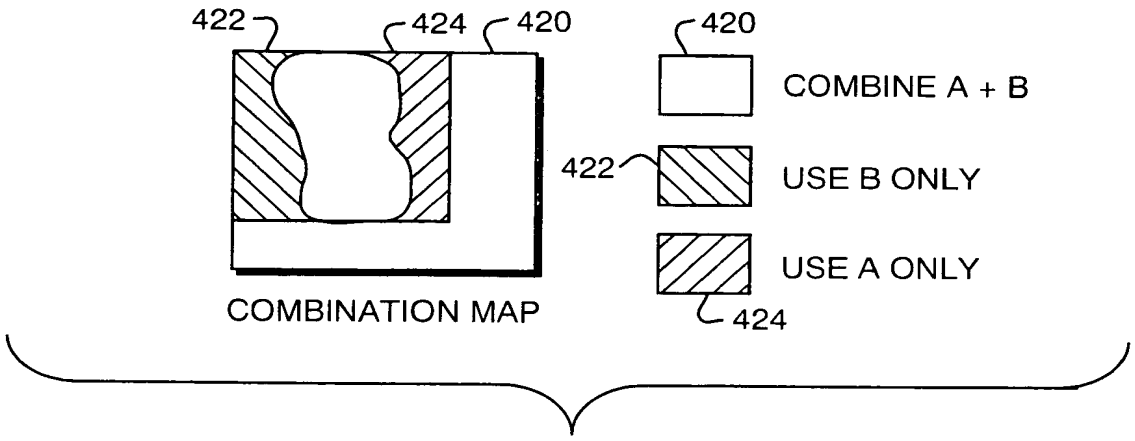

422
424
420
COMBINATION MAP
420
COMBINE A + B
422
USE B ONLY
USE A ONLY
424

FIG. 4B

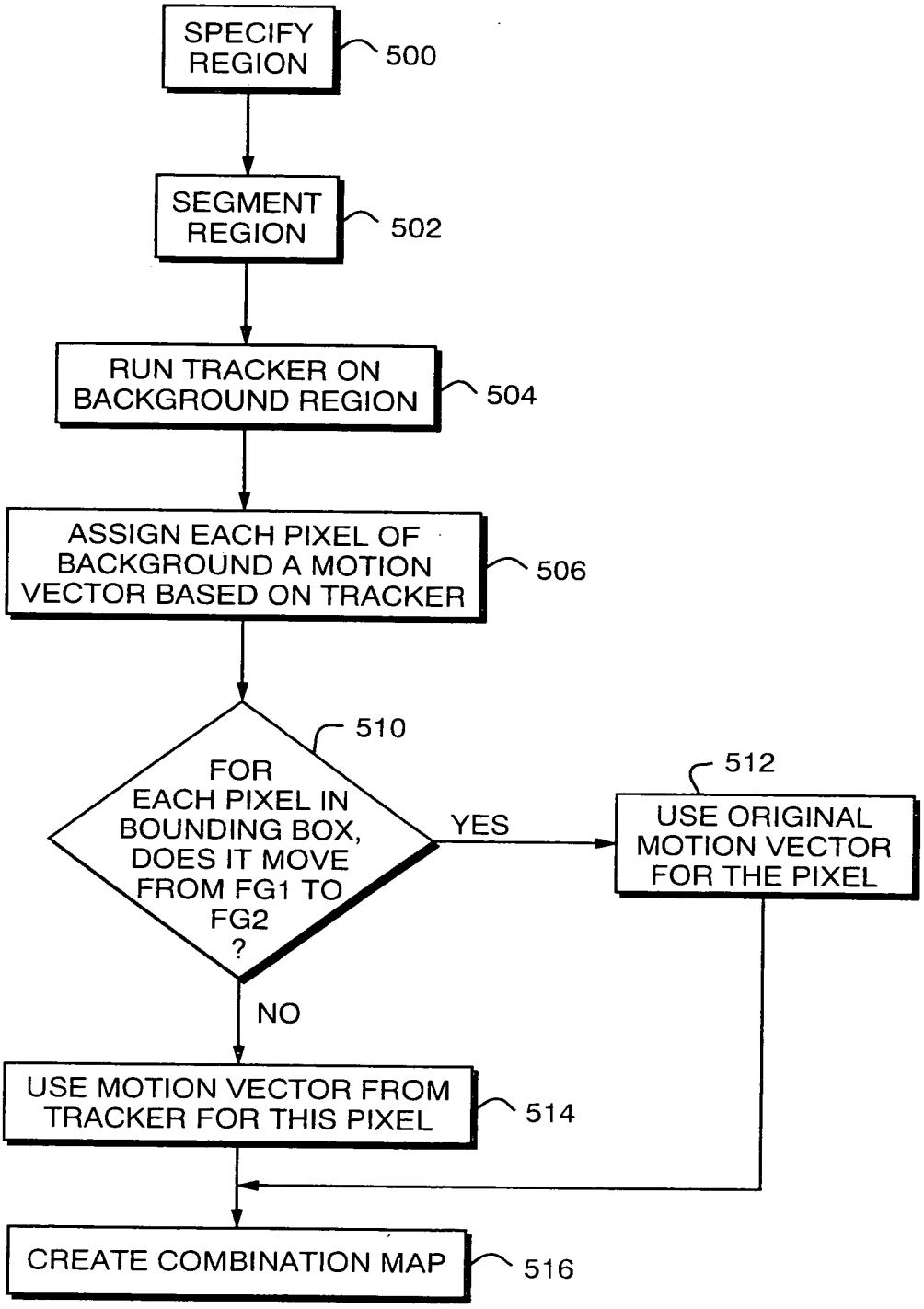

SPECIFY REGION
500
SEGMENT REGION
502
RUN TRACKER ON BACKGROUND REGION
504
ASSIGN EACH PIXEL OF BACKGROUND A MOTION VECTOR BASED ON TRACKER
506
510
FOR EACH PIXEL IN BOUNDING BOX, DOES IT MOVE FROM FG1 TO FG2 ?
YES
512
USE ORIGINAL MOTION VECTOR FOR THE PIXEL
NO
USE MOTION VECTOR FROM TRACKER FOR THIS PIXEL
514
CREATE COMBINATION MAP
516

FIG. 5A

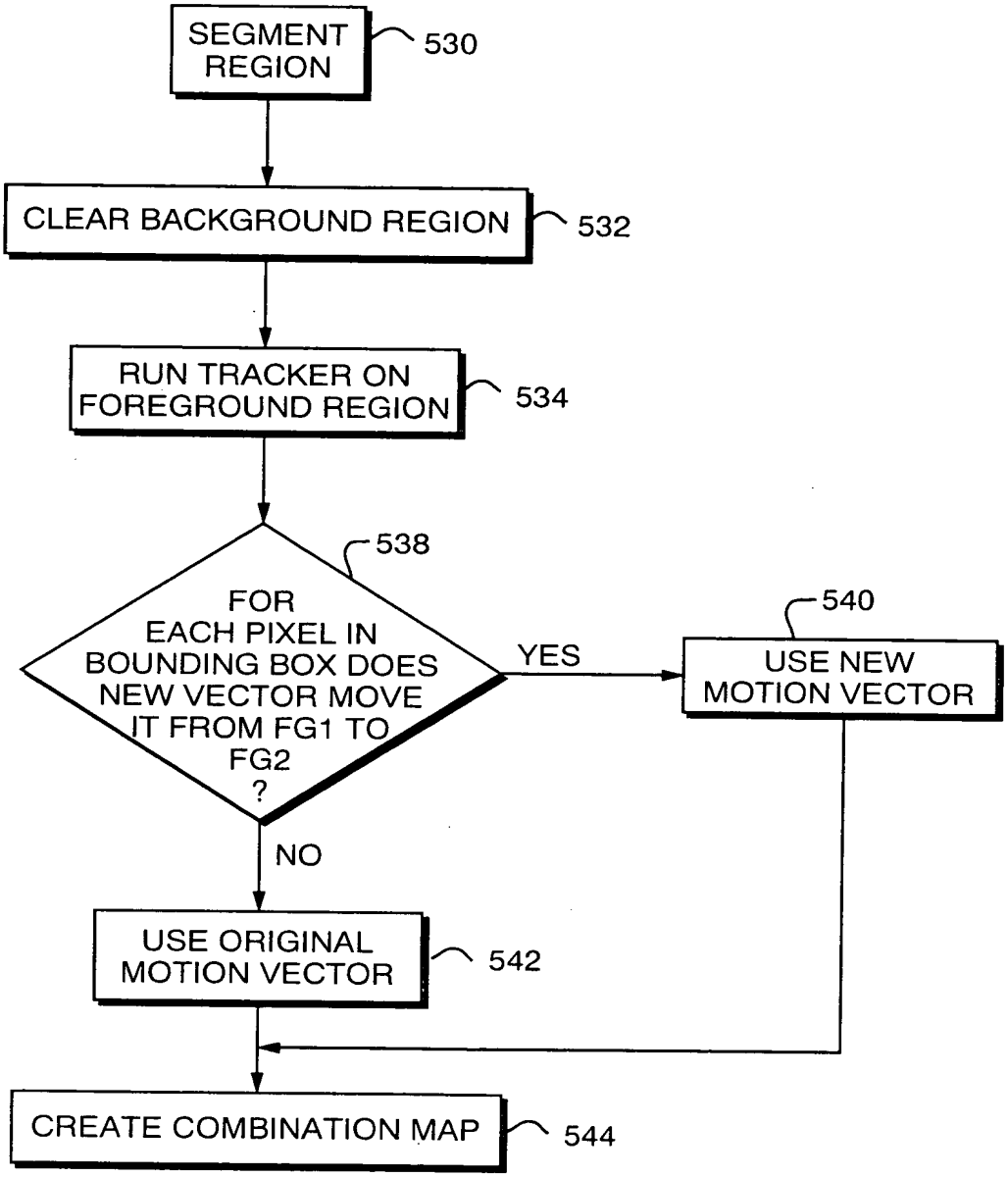

SEGMENT REGION
530
CLEAR BACKGROUND REGION
532
RUN TRACKER ON FOREGROUND REGION
534
538
FOR EACH PIXEL IN BOUNDING BOX DOES NEW VECTOR MOVE IT FROM FG1 TO FG2 ?
YES
540
USE NEW MOTION VECTOR
NO
USE ORIGINAL MOTION VECTOR
542
CREATE COMBINATION MAP
544

FIG. 5B

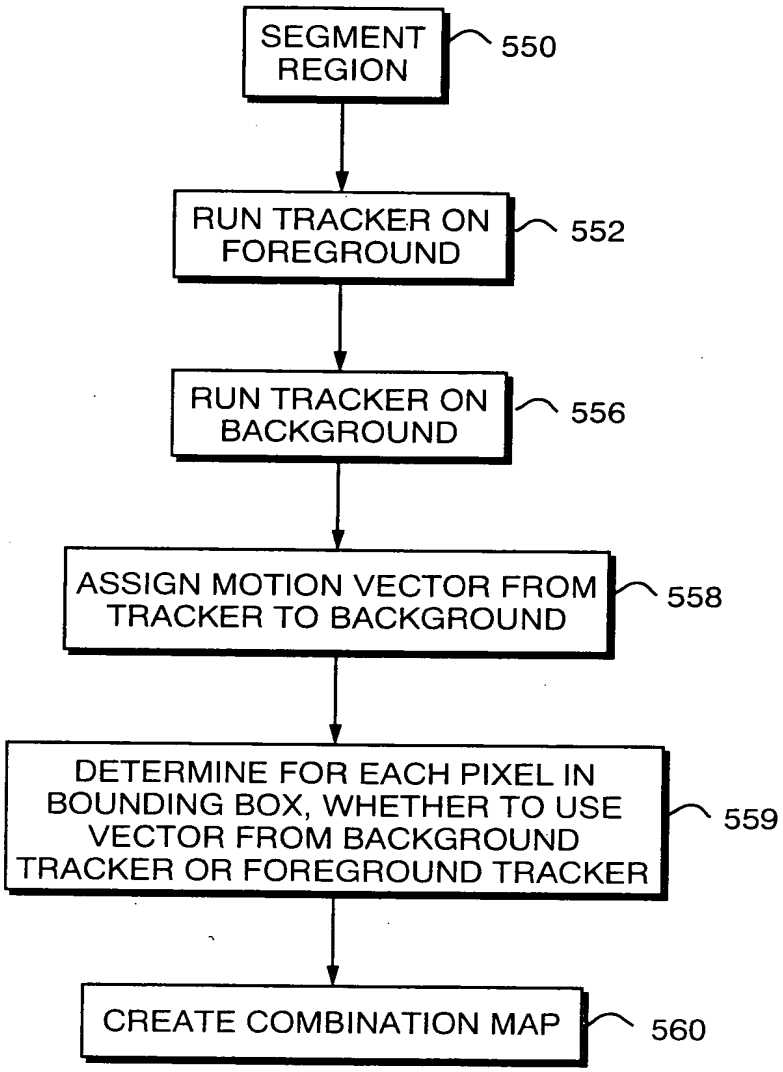

SEGMENT REGION
550
RUN TRACKER ON FOREGROUND
552
RUN TRACKER ON BACKGROUND
556
ASSIGN MOTION VECTOR FROM TRACKER TO BACKGROUND
558
DETERMINE FOR EACH PIXEL IN BOUNDING BOX, WHETHER TO USE VECTOR FROM BACKGROUND TRACKER OR FOREGROUND TRACKER
559
CREATE COMBINATION MAP
560

FIG. 5C

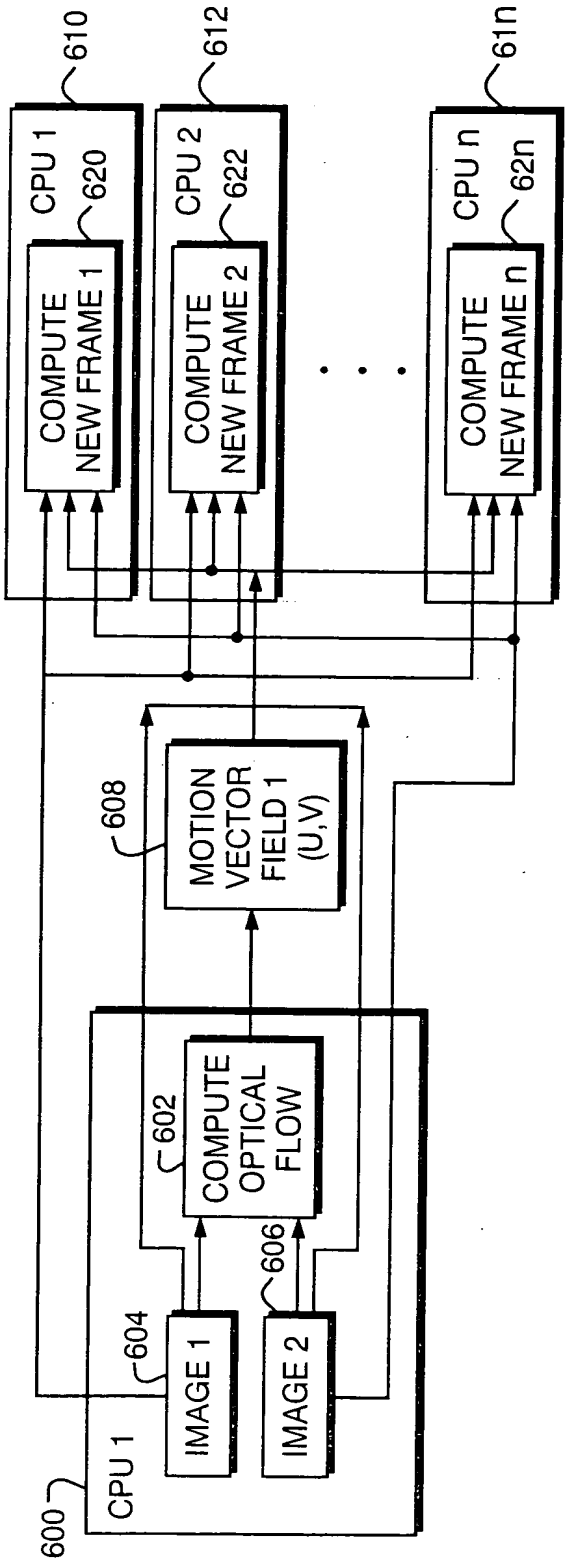

CPU 1
600
IMAGE 1
604
IMAGE 2
606
COMPUTE OPTICAL FLOW
602
MOTION VECTOR FIELD 1 (U,V)
608
CPU 1
610
COMPUTE NEW FRAME 1
620
CPU 2
612
COMPUTE NEW FRAME 2
622
CPU n
61n
COMPUTE NEW FRAME n
62n

FIG. 6

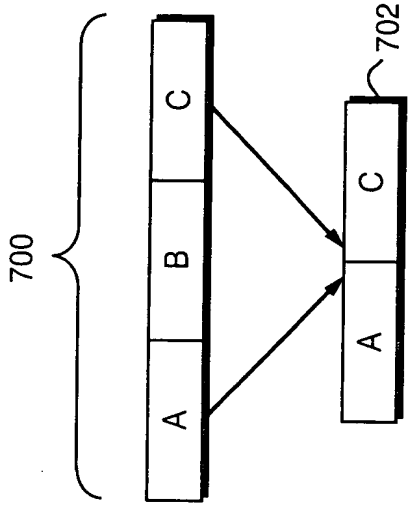


FIG. 7

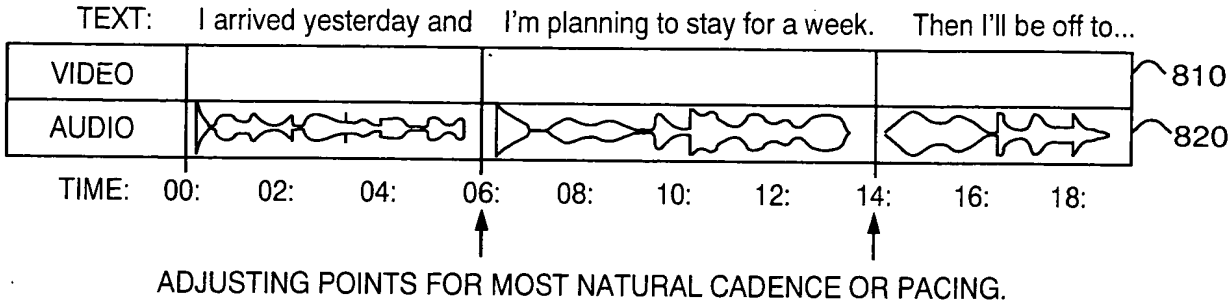


FIG. 8A

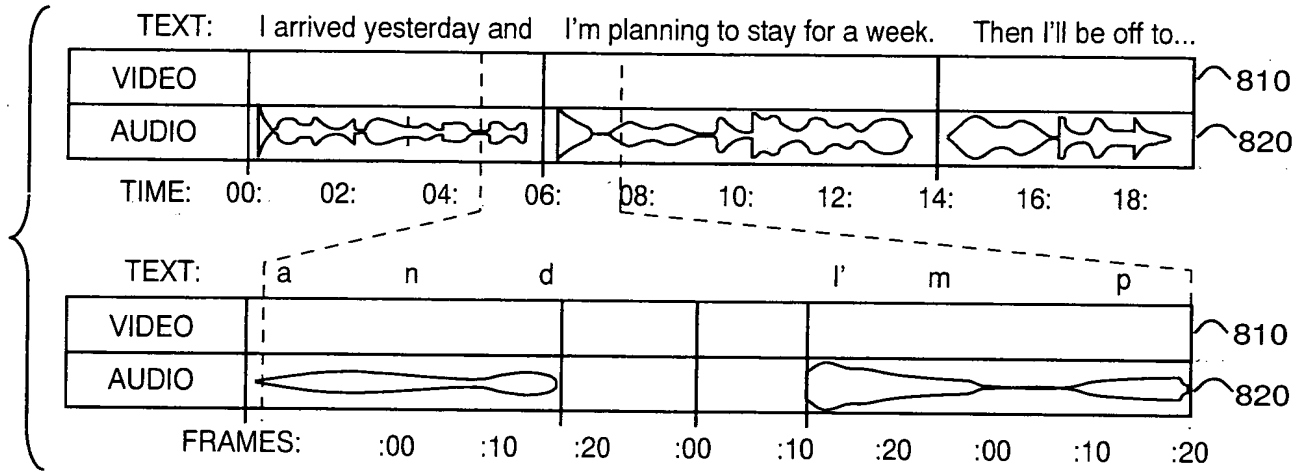


FIG. 8B

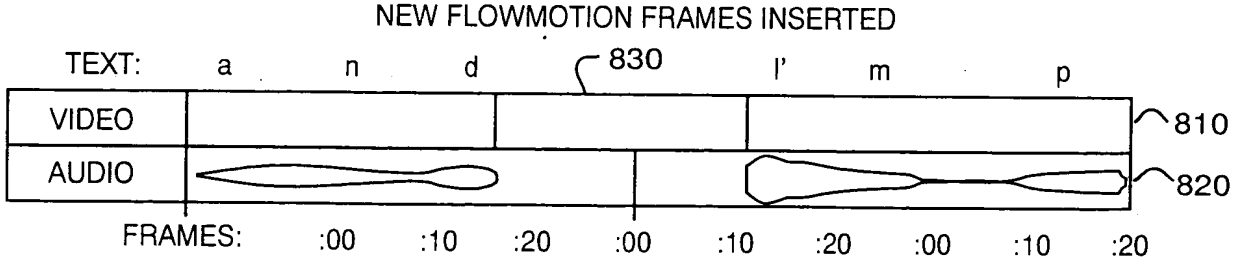


FIG. 8C

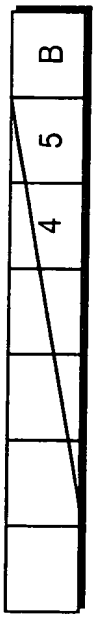


FIG. 9